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ART UNIT	**PAPER NUMBER**
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NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

lhpto@leehayes.com

Office Action Summary	Application No.	Applicant(s)	
	10/800,342	CALVER ET AL.	
	Examiner	Art Unit	
	David P. Rashid	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11, 13-18, and 20-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11, 13-18, and 20-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 August 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

All of the examiner's suggestions presented herein below have been assumed for examination purposes, unless otherwise noted.

Amendments

1. This office action is responsive to the claim and specification amendment received on 8/20/2007. **Claims 1 – 11, 13 – 18,** and **20 – 43** remain pending; **claims 12** and **19** cancelled.

Drawings

2. The replacement drawings were received on 8/20/2007 and are acceptable. In response to applicant's drawing amendments and remarks, the previous drawing objections are withdrawn.

Specification

3. In response to applicant's specification amendments and remarks received on 8/20/2007, the previous specification objections are withdrawn.

Claim Objections

4. In response to applicant's claim objections amendments and remarks received on 8/20/2007, the previous claim objections are withdrawn.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1** and **3 – 43** are rejected under 35 U.S.C. 103(a) as being unpatentable over Rao et al. (US 6,366,689 B1) in view of Rao et al. (US 5,666,441 A).

Regarding **claim 1**, while Rao'689 discloses a system (FIG. 2), comprising:

a camera ("digital camera" in Col. 1, lines 54 – 55; FIG. 2, elements 108, 204) to obtain an image (FIG. 5, elements 510, 514) of a semiconductor defect space (FIG. 2, element 102); and

an image evaluator (FIG. 5, element 516) to recognize lines (FIG. 2, element 104; FIG. 7B) within the image, and to evaluate the lines for indications of semiconductor defects (FIG. 5, element 518); and

a projection pattern image library comprising a projection pattern image ("expected illumination pattern" in Col. 10, lines 17 – 19);

wherein the image evaluator is configured to compare (FIG. 5, elements 526, 528) the image to the projection pattern image, Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by

Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 3**, Rao'689 discloses wherein the lines include straight lines (the straight lines in FIG. 7B grid) or curves.

Regarding **claim 4**, Rao'689 discloses wherein the indications are selected from a group consisting of:

slope of at least one of the recognized lines;

change in brightness along at least one of the recognized lines; and

discontinuity in at least one of the recognized lines (Col. 7, lines 23 – 26).

Regarding **claim 5**, while Rao'689 discloses additionally comprising:

a projection pattern generator to trace a laser (FIG. 2, element 106) over a projection pattern (FIG. 2, element 104) within the semiconductor defect space (FIG. 2, element 102), wherein the projection pattern comprises the lines (FIG. 2, element 104; FIG. 7B) within the image (FIG. 5, elements 510, 514) , Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 6**, Rao'689 discloses wherein the laser (FIG. 2, element 106) and the camera (FIG. 2, elements 108, 204) are separately located (FIG. 2 wherein they are both separately located) to enhance the camera's perspective to view of slope of at least one of the recognized lines.

Regarding **claim 7**, while Rao'689 in view of Rao'441 discloses the system of claim 1, Rao'689 does not additionally comprise: an edge detection module to detect edges of surfaces defining the cargo space, wherein the edges comprise the lines within the image.

Rao'441 teaches an edge detection module ("DETECT EDGES" in FIG. 4) to detect edges of surfaces defining the cargo space (FIG. 2), wherein the edges comprise lines (lines in FIG. 5, 7, 8, 9, 10, and 11) within the image (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the system of Rao'689 in view of Rao'441 to additionally comprise: an edge detection module to detect edges of surfaces defining the cargo space, wherein the edges comprise the lines within the image as taught by Rao'441 as "a need exists for a computer vision

system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 8**, while Rao'689 discloses wherein evaluating the lines comprises recognizing two different distances (FIG. 7A, elements 704, 708 from point B in comparison to point A; FIG. 7B, elements 710, 712; determining difference between expected and actual grid pattern (FIG. 5, element 526) must also include finding the difference between portions of lines between the two images) between portions of two lines is an indication of a semiconductor defect (Col. 11, lines 20 – 52), Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 9**, while Rao'689 discloses a processor-readable medium comprising processor-executable instructions (FIG. 2, element 202) for:

sensing lines (FIG. 2, elements 108, 204) within an image (FIG. 5, elements 510, 514) of a semiconductor defect space (FIG. 2, element 102);

evaluating the lines (FIG. 5, elements 516); and

basing an indication of presence of semiconductor defects on the evaluation (FIG. 5, element 518):

wherein the evaluating comprises instructions for:

measuring distances (FIG. 7A, elements 704, 708 from point B in comparison to point A; FIG. 7B, elements 710, 712; determining difference between expected and actual grid pattern (FIG. 5, element 526)) between lines within a projection pattern (FIG. 2, element 104); and

determining if the measured distances indicate the presence of semiconductor defects (FIG. 5, elements 526, 528) , Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect

edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 10**, while Rao'689 discloses wherein the lines are formed by instructions (FIG. 2, element 202) for tracing a laser (FIG. 2, element 106) over a pattern (FIG. 2, element 104) within the semiconductor defect space (FIG. 2, element 102), Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 11**, while Rao'689 in view of Rao'441 discloses a processor-readable medium as recited in claim 9, Rao'689 in view of Rao'441 do not teach wherein the lines are formed by instructions for intersection of planes defining the cargo space.

Rao'441 discloses wherein the lines are formed by instructions for intersection of planes defining the cargo space (High level grouping to detect 3D rectangular objects discloses using

the three unit vectors in the image plan as shown in FIG. 26 to calculate fork junctions and triplets as disclosed from column 7, line 46 through column 8, line 51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the processor-readable medium of Rao'689 in view of Rao'441 to include wherein the lines are formed by instructions for intersection of planes defining the cargo space as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 13**, Rao'689 discloses wherein the evaluation comprises instruction for measuring slope of lines (FIG. 5, elements 522, 528; the slope of lines in 3D space is comparing FIG. 7B elements 750, 760) within a projection pattern (FIG. 2, element 104).

Regarding **claim 14**, Rao'689 discloses wherein the evaluating comprises instructions for reviewing lines within a projection pattern for breaks in continuity (Col. 7, lines 23 – 26).

Regarding **claim 15**, Rao'689 discloses wherein the evaluating comprises instructions for measuring uniformity of brightness of lines within a projection pattern (Col. 7, lines 23 – 26 wherein detecting a break in the line would be detecting a break in the brightness of the line also).

Regarding **claim 16**, while Rao'689 discloses a processor-readable medium comprising processor-executable instructions (FIG. 2, element 202) for:

forming a pattern (FIG. 2, element 104) within a semiconductor defect space (FIG. 2, element 102) using a laser (FIG. 2, element 106) and lines formed by intersection of planes (all the planes from element 716 of FIG. 7A) forming the semiconductor defect space;

obtaining an image (FIG. 5, elements 510, 514) of the pattern;

analyzing the image, wherein the analyzing comprises measuring distances (FIG. 2, element 516 wherein comparing the first image data and second must involve comparing distances; FIG. 7A, elements 704, 708 from point B in comparison to point A; FIG. 7B, elements 710, 712) between lines within the pattern and comparing (FIG. 5, elements 526, 528) the measurement to expected measurements ("expected illumination pattern" in Col. 10, lines 17 – 19) ; and

basing an indication of semiconductor defect presence on the analysis (Col. 10, lines 10 – 32), Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 17**, Rao'689 discloses wherein the forming comprises instructions (FIG. 2, element 202) for comparing the image to images within a projection pattern image library ("EXPECTED...GRID PATTERN" in elements 526, 528 of FIG. 5 come from a "projection pattern image library").

Regarding **claim 18**, Rao'689 discloses wherein the obtaining comprises instructions (FIG. 2, elements 202, 108, 204) for operating a camera to capture the image.

Regarding **claim 20**, while Rao'689 discloses a processor-readable medium as recited in claim 16, wherein the analyzing comprises instructions for recognizing a slope change, in a line within the pattern, indicating semiconductor defect presence ("If the features are damaged, the illumination by the grid will generate lines that are not existent, broken, or otherwise indicative of damage. Such features are excluded from the angular displacement analysis. The method then proceeds to 528 where the difference between the expected and actual image data is used to determine the angle from a normal plane of the plane in which the device or component lies. This angle is determined for each data point with respect to the angle at which the data point was taken when composite image data from two or more imaging systems is used.", column 10, line 22) Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer

vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 21**, while Rao'689 discloses wherein the analyzing comprises instruction for recognizing brightness change (Col. 7, lines 23 – 26 wherein detecting a break in the line would be detecting a break in the brightness of the line also), in a line within the pattern, indicating semiconductor defect presence, Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 22**, while Rao'689 discloses wherein the analyzing comprises instructions for recognizing discontinuities (Col. 7, lines 23 – 26), in a line within the pattern,

indicating semiconductor defect presence, Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 23**, while Rao'689 discloses a semiconductor defect sensing device (FIG. 2, element 202), comprising:

means (FIG. 2, element 106) for defining a pattern (FIG. 2, element 104) within a semiconductor defect space (FIG. 2, element 102), wherein the pattern is formed by projection and by lines formed by intersection of planes forming the semiconductor defect space (refer to references/arguments cited in claim 16; all the planes from element 716 of FIG. 7A);

means for obtaining an image (FIG. 2, elements 108, 204) of the projection pattern (FIG. 2, element 104);

means for measuring distortion of the projection pattern within the image (refer to references/arguments cited in claim 16; FIG. 2, element 516; FIG. 7A, 7B); and

means for comparing the distortion to a threshold value (a threshold value must exist for obstructed features to be detected in FIG. 5, element 518), Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 24,** claims 20, 21, and 22 recites identical features as in claim 24. Thus, references/arguments equivalent to those presented above for claims 20, 21, and 22 are equally applicable to claim 24.

Regarding **claim 25**, while Rao'689 discloses wherein the projection pattern (FIG. 2, element 104) is defined by lines resulting from intersection of planes (FIG. 7A wherein element 716 contains many planes that "intersect") defining the semiconductor defect space (FIG. 2, element 102), Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 26**, Rao'689 discloses wherein the means for measuring distortion measures distances (a measuring of distances between lines must be done when comparing the two images, as well as comparing with the expected grid pattern in FIG. 5, elements 516, 526) between lines within the projection pattern.

Regarding **claim 27,** claim 22 recites identical features as in claim 27. Thus, references/arguments equivalent to those presented above for claims 22 are equally applicable to claim 27.

Regarding **claim 28,** claim 17 recites identical features as in claim 28. Thus, references/arguments equivalent to those presented above for claims 17 are equally applicable to claim 28.

Regarding **claim 29**, while Rao'689 discloses a method of determining semiconductor defect presence (FIG. 2), comprising:

defining a projection pattern (FIG. 2, element 104) within a semiconductor defect space (FIG. 2, element 102);

capturing an image (FIG. 5, elements 510, 514) of the projection pattern with a camera (FIG. 2, elements 108, 204);

evaluating lines within the projection pattern for evidence of semiconductor defect (FIG. 5, elements 516, 526, 528); and

basing an indication of semiconductor defect presence on the evaluation (Col. 10, lines 10 – 32), Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 30,** claim 5 recites identical features as in claim 30. Thus, references/arguments equivalent to those presented above for claims 5 are equally applicable to claim 30.

Regarding **claim 31,** claim 25 recites identical features as in claim 31. Thus, references/arguments equivalent to those presented above for claims 25 are equally applicable to claim 31.

Regarding **claim 32,** claim 22 recites identical features as in claim 32. Thus, references/arguments equivalent to those presented above for claims 22 are equally applicable to claim 32.

Regarding **claim 33,** claim 21 recites identical features as in claim 33. Thus, references/arguments equivalent to those presented above for claims 21 are equally applicable to claim 33.

Regarding **claim 34,** claim 20 recites identical features as in claim 34. Thus, references/arguments equivalent to those presented above for claims 20 are equally applicable to claim 34.

Regarding **claim 35**, Rao'689 discloses wherein the evaluating comprises:

measuring distance (FIG. 7A, elements 704, 708 from point B in comparison to point A; FIG. 7B, elements 710, 712; determining difference between expected and actual grid pattern (FIG. 5, element 526)) between the lines within the projection pattern (FIG. 2, element 104); and

determining if the measured distance is within a threshold of an appropriate value (a threshold must exist for the determination of a semiconductor defect presence using the comparison of images that must use distance measurements).

Regarding **claim 36**, while Rao'689 discloses a method (FIG. 2), comprising:

forming an optical pattern (FIG. 2, element 104) within a semiconductor defect space (FIG. 2, element 102), wherein the pattern is formed by projection and by lines formed by

intersection of planes (there are many intersection of planes from element 716 of FIG. 7A) forming the semiconductor defect space; and

analyzing the optical pattern (FIG. 5, elements 516, 518, 526, 528) to determine whether semiconductor defect is present (Col. 10, lines 10 – 32) within the semiconductor defect space, Rao'689 does not teach wherein the space is cargo space in search of cargo presence.

Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

Regarding **claim 37,** claim 5 recites identical features as in claim 37. Thus, references/arguments equivalent to those presented above for claims 5 are equally applicable to claim 37.

Regarding **claim 38,** claim 36 recites identical features as in claim 38. Thus, references/arguments equivalent to those presented above for claims 36 are equally applicable to claim 38.

Regarding **claim 39,** claim 20 recites identical features as in claim 39. Thus, references/arguments equivalent to those presented above for claims 20 are equally applicable to claim 39.

Regarding **claim 40**, claim 19 recites identical features as in claim 40. Thus, arguments and references cited equivalent to that presented above for claim 19 are equally applicable to claim 40.

Regarding **claim 41**, claims 16 and 17 recite identical features as in claim 41. Thus, arguments and references cited equivalent to that presented above for claims 16 and 17 are equally applicable to claim 41.

Regarding **claim 42**, claims 17 recite identical features as in claim 42. Thus, arguments and references cited equivalent to that presented above for claims 17 are equally applicable to claim 42.

Regarding **claim 43**, while Rao'689 discloses the method of claim 36 wherein the analyzing step comprises comparing the optical pattern to a projection pattern image library comprising images of defective-free and microchip containing areas, Rao'689 does not disclose the analyzing step comprising comparing the optical pattern to a projection pattern image library comprising images of empty cargo areas and cargo-containing cargo areas.

Rao'441 detects the presence of cargo within cargo space through the evaluation of lines (refer to claim 1) and a projection pattern as discussed above (refer to claim 8). In particular, Rao'441 compares images of empty cargo areas and cargo-containing cargo areas ("To illustrate the above system, reconsider FIG. 2, an image being analyzed for the presence of a box. FIG. 12 and 13 show the edge maps of images of FIGS. 2 and 6 respectively (FIG. 2 is the image being

analyzed and FIG. 6 is the reference image).", column 9, line 41 in combination with comparing the two images of FIG. 2 and FIG. 6.).

It would have been obvious at the time the invention was made to one ordinary skilled in the art to compare images of empty cargo areas and cargo-containing cargo areas as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17.

6. **Claim 2** is rejected under 35 U.S.C. 103(a) as being unpatentable over Rao et al. (US 6,366,689 B1) in view of Rao et al. (US 5,666,441 A) and Hannon et al. (US 4,688,244 A).

Regarding **claim 2**, while Rao'689 in view of Rao'441 discloses the system of claim 1, Rao'689 in view of Rao'441 does not teach the camera comprising an infrared (IR) imaging device.

Hannon et al. teaches an integrated cargo security system (title of the patent) with a imaging device comprising an infrared camera ("A high light sensitivity camera is preferred, and under some conditions, an infrared sensitive camera may be employed...", column 7, line 65.)

It would have been obvious at the time the invention was made to one ordinary skilled in the art for the camera of Rao'689 in view of Rao'441 to include a camera comprising an infrared imaging device as taught by Hannon et al. "...for very low light conditions.", column 7, line 67.

Response to Arguments

7. Applicant's arguments filed on 8/20/2007 with respect to independent **claims 1 – 11, 13 – 18,** and **20 – 43** have been respectfully and fully considered, they are not found persuasive.

8. **Summary of Remarks** regarding **claims 1, 9** and **29**:

(i) Applicant argues that since claim 1 now recites "a projection pattern image" (@ *response page 15*) and "wherein the image evaluator is configured to compare the image to the projection pattern image" (@ *response page 16*), claim 9 now recites "measuring distances between lines within a projection pattern" (@ *response page 17*), and claim 29 now recites "defining a projecting pattern within a cargo space" and "evaluating lines within the projection pattern for evidence of cargo" (@ *response page 18*), Rao'441 reference does not show or disclose such elements.

(ii) Applicant argues that Rao'441 evaluation of forks is not evaluating a projection pattern, and is not evaluating for the evidence of cargo for claim 29 (@ *response page 19*).

9. **Examiner's Response** regarding **claims 1, 9** and **29**:

(i) Applicant's arguments with respect to claims 1, 9, and 29 have been considered but are moot in view of the new ground of rejection as Rao'689 in view of Rao'441 anticipates all elements described above in **Section 5**.

(ii) Applicant's arguments with respect to claim 29 have been considered but are moot in view of the new ground of rejection as Rao'689 in view of Rao'441 anticipates all elements described above in **Section 5**.

10. **Summary of Remarks** regarding **claims 2 – 8, 10 – 15,** and **30 – 35**:

Applicant argues that the dependent claims in question are allowable due to their dependence from an allowable base claim. These claims are also allowable for their own recited features that, in combination with those recited in their respective independent claim, are not disclosed by the reference of record (@ *response pages 16, 18, 19*).

11. **Examiner's Response** regarding **claims 2 – 8, 10 – 15,** and **30 – 35**:

It has been shown the new ground of rejection as Rao'689 in view of Rao'441 anticipates independent claims 1, 9, and 29, and thus the dependent claims in question are not allowable due to their dependence from an allowable base claim. These claims are also not allowable for their own recited features that, in combination with those recited in their respective independent claim, as **Section 5** describes the anticipation of Rao'689 in view of Rao'441 (and Rao'689 in view of Rao'441 and Hannon for claim 2).

12. **Summary of Remarks** regarding **claims 16, 23,** and **36**

Applicant argues that even combined Rao'689 and Rao'441 do not teach or suggest the use of lines formed by intersection of planes forming the cargo space. Rao'689 and Rao'441, even taken together, fail to teach or suggest using the walls of the cargo area as a part of a pattern, wherein measurements of distances within the pattern indicate the presence of cargo (@ *response page 20*). Claims 23 and 26 are allowable at least for the reasons that claim 16 is allowable (@ *response page 21*).

13. **Examiner's Response** regarding **claims 16, 23,** and **36**

Rao'689 does form a pattern within a semiconductor defect space using a laser and lines formed by intersection of planes forming the semiconductor space. The examiner notes that lines are formed by intersection of planes in at least two ways (and thus forming a semiconductor space). First, the semiconductor space contains elements 716 (FIG. 7A, Rao'689) that forms its own lines by intersection of planes as any 3D object with at least two intersecting 2D planes would create a "line". Second, lines from the laser grid itself (sources A, B in FIG. 7A, Rao'689) are formed by the intersection of planes already occurring on element 716 (as any 3D object with at least two intersecting 2D planes would create a "line" already). The claim language is broad enough to cover these two examples, as well as applicant's view. However, Rao'689 does not teach wherein the space is cargo space in search of cargo presence. Rao'441 teaches a computer vision system to detect 3-D cargo objects in search of cargo presence (FIG. 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made for the semiconductor defect space of Rao'689 to include cargo space as taught by Rao'441 and the image evaluator indicating the presence of semiconductor defects of Rao'689 to include indicating the presence of cargo as taught by Rao'441 as "a need exists for a computer vision system which has the ability to detect 3-D rectangular solids without requiting perfect edges.", Rao'441, Col. 2, lines 54 – 57 and that "packing boxes, trailers of tracks and rectangular buildings are a few objects which could be detected with the ability to detach 3-D (three dimensional) rectangular solids", Rao'441, Col. 1, lines 15 – 17. Claims 23 and 26 are not allowable at least for the reasons that claim 16 is allowable.

14. **Summary of Remarks** regarding **claims 17 – 22, 24 – 26,** and **37 – 43**:

Applicant argues that the dependent claims in question are allowable due to their dependence from an allowable base claim. These claims are also allowable for their own recited features that, in combination with those recited in their respective independent claim, are not disclosed by the reference of record (*@ response page 21*).

15. **Examiner's Response** regarding **claims 17 – 22, 24 – 26,** and **37 – 43**:

It has been shown the new ground of rejection as Rao'689 in view of Rao'441 anticipates independent claims 16, 23, and 36, and thus the dependent claims in question are not allowable due to their dependence from an allowable base claim. These claims are also not allowable for their own recited features that, in combination with those recited in their respective independent claim, as **Section 5** describes the anticipation of Rao'689 in view of Rao'441.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David P. Rashid whose telephone number is (571) 270-1578. The examiner can normally be reached Monday - Friday 8:30 - 17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Rashid/
Examiner, Art Unit 2624

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BRIAN WERNER
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